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10/015,603	12/17/2001	Laure Monconduit-Jegou	004900-209	4768

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EXAMINER

ALEJANDRO, RAYMOND

ART UNIT

PAPER NUMBER

1745

DATE MAILED: 08/08/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/015,603

Applicant(s)

MONCONDUIT-JEGOU ET AL.

Examiner

Raymond Alejandro

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) 6-15 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 16-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other:

**DETAILED ACTION*****Election/Restrictions***

1. Applicant's election with traverse of Group I (claims 1-5 and 16-21) in Paper No. 5 is acknowledged. The traversal is on the ground(s) that "the searches required to completely examine the claims would substantially overlap...it would be an undue burden upon the examiner to examine both groups of claims". This is not found persuasive because the particular search for the elected claims is not required for non-elected claims, that is, the search required for the electrode and the electrochemical cell/battery is not particularly required for the process of making the electrode. As admitted by the applicants, the inventive concepts involve both the electrode active material per se and the making thereof. However, since the restriction requirement has been treated as process of making and product made, it is further noted that the inventions are distinct because the process as claimed can be used to make other and materially different product such as an electrode material comprising a distinct lithium metal nitride which is a materially different product well known in the art; as well as the product as claimed can be made by another and materially different process, for example, by dry-mixing; by a wet method; by dispersing the constituents; by mixing solution comprising specific water-soluble salts of such constituents; by sintering; by dry-blending; by spraying a mixture of slurry; by compression moulding; or *by process not including the quenching step or an inert atmosphere (the latter has been admitted by the applicants)*. Further, these inventions are distinct, and acquire a separate status in the art because Group I (the electrode material) is classified in class 429/ 231.95 while Group II (the process for making the electrode material) is classified in class 29/623.1.

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Accordingly, serious burden would be raised if the search of both different inventions was made as required for the separate and distinct inventions..

The requirement is still deemed proper and is therefore made **FINAL**.

### ***Specification***

2. The disclosure is objected to because of the following informalities: the specification at page 4, section 0014 and page 10, section 0044 contains the term “stoichiometry” and “stoichiometric” misspelled. Appropriate correction is required.
3. The disclosure is objected to because of the following informalities: the specification at page 5, section 0021 contains certain brackets (i.e. “[” or “[“) which appears to indicate deletion of words, terms or phrases. Applicant is requested to clarify whether or not the brackets intend to delete the terms proximate to them. Appropriate correction is required.

### ***Claim Objections***

4. Claim 16 is objected to because of the following informalities: the term “elctrolyte” should be corrected as follows “electrolyte”. Appropriate correction is required.

### ***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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6. Claim 3 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

7. Claim 3 recites the limitation "wherein, in formula (I), M represents a metal" in lines 19-20. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

9. Claims 1, 16 and 19 are rejected under 35 U.S.C. 102(e) as being anticipated by Nakura US 2002/0015890.

The instant application is directed to an electrode and battery wherein the disclosed inventive concept comprises the specific electrode material. Other limitations include the particular chemical formula and elements, the specific metals represented by M and the particular molar amounts; in addition, an electrochemical cell and a rechargeable lithium-ion battery comprising the specific negative electrode active material is intended.

With respect to claims 1, 16, 19:

Nakura discloses the following (ABSTRACT; SECTION 0012 and 0013; Claims 1-2):

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(57)

**ABSTRACT**

A lithium secondary battery having a higher energy density and a longer cycle life than conventional batteries is disclosed, which comprises a positive electrode capable of absorbing and desorbing lithium, a non-aqueous electrolyte and a negative electrode capable of absorbing and desorbing lithium, wherein the negative electrode comprises a nitride represented by the general formula:  $\text{Li}_x\text{A}_y\text{Me}_z\text{N}$ , where A is boron, silicon or aluminum, Me is at least one element selected from the group consisting of transition metal elements and metal elements of Group IIIB, IVB and VB, and x, y and z satisfy  $0 < x < 3$ ,  $0 < y \leq 1$ ,  $0 < z \leq 1$  and  $0 < x + y + z \leq 3$ .

[0013] The Me is preferably at least one element selected from the group consisting of Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zr, Nb, Mo, Ru, Sn, W, Pb and Bi.

*Hence, Nakura teaches a lithium metal nitride comprising an intermetallic lithium/transition metal pnictide phase and a metal of one of the columns IVa and Va. Thus, the claims are anticipated.*

***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

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invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 1-5 and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dai US 2003/0003369 in view of Nakura US 2002/0015890.

With respect to claims 1-2, 4, 17, 20:

Dai discloses that the preferred anode for practical use includes anode active materials including lithium metal nitrides such as  $\text{Li}_{2.6}\text{Co}_{0.4}\text{N}$  (SECTION 0021). Thus,  $x = 2.6$  and  $y = 0.4$ .

With respect to claims 1, 16 and 19:

Dai discloses lithium ion cell (title) wherein the cell comprises a cathode, an anode, a separator and an electrolyte (SECTION 0018).

[0018] One embodiment of the lithium battery cell of the present invention, shown in FIG. 1, comprises a cathode current collector of graphite foil, 1, an anode comprising an anode active material, 2, a separator, 3, a cathode comprising a cathode active material, 4, a copper mesh anode current collector, 5, and an electrolyte solution, 6, comprising an aprotic solvent and a lithium compound, said electrolyte

Dai disclose a lithium ion cell comprising an anode material according to the foregoing. However, Dai does not disclose the specific metal and specific molar amount ranging between 0.7 to 1.3.

With respect to claims 1-3, 17-18 and 20-21:

Nakura teaches a lithium battery wherein the negative electrode comprises a metal nitride wherein Me is at least one element selected from the group consisting of transition metal elements, preferably, from the group consisting of Ti, V and Nb, among other elements (ABSTARCT/ SECTION 0012-0013/ CLAIMS 1-2).

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With respect to claims 5:

Nakura teaches that the molar amount  $z$  of the transition metal element Me in the lithium metal nitride composite ranges from  $0 < z \leq 1$  (SECTION 0012).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific metal of Nakura in the negative electrode of Dai as Nakura teaches that the transition metal element gives an electronic conductivity to the lithium ion conductor. Accordingly, by using these elements (the transition metals), the potential of the nitride becomes approximately 0.8 V versus that of lithium, and a battery having a high capacity and a long cycle life can be obtained.

As to the specific molar amount ranging between 0.7 to 1.3, it would have been obvious to one skilled in the art at the time the invention was made to make the negative electrode of Dai by having the specific molar amount range within 0.7-1.3 as Nakura teaches that the negative electrode comprising the specified molar amount of transition metal element is preferably because it imparts better electronic conductivity to the lithium ion conductor. As a result, the metal nitride would have a capacity much greater than the capacity of a lithium nitride compound per se. This is because it is presumably that both nitrogen as well as the transition element participates in the redox reaction.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (703) 306-3326. The examiner can normally be reached on Monday-Thursday (8:30 am - 7:00 pm).



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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Raymond Alejandro  
Examiner  
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A handwritten signature in black ink, appearing to read 'RAM', is written over the printed name and title of the examiner.